

THE FOLLOWING REPORT COWERS MY OBSERVATIONS AND FURTHER STUDY ON THE U-2 INCIDENT INVOLVING FRANCIS GARY POWERS ON 1 MAY 1960. I WOULD LIKE TO SUMMARIZE MY THOUGHTS REGARDING THE CAUSE AND SEQUENCE OF FAILURE IN THE AIRCRAFT IN WHICH POWERS WAS SHOT DOWN. IN OUR VISIT TO POWERS ON 14 FEBRUARY, HE DESCRIBED TO US HIS REACTIONS TO THE INCIDENT. ALL STATEMENTS HE MADE CORRELATE EXTREMELY WELL WITH RESULTS OF MY STUDIES MADE IMMEDIATELY AFTER THE MAY 1960 INCIDENT AND REVIEWED AGAIN DURING THIS LAST WEEK.

AS YOU KNOW, IN MAY 1960 WE SIMULATED POWERS' FLIGHT MISSION AND STUDIED WHAT AIRCRAFT COMPONENTS COULD FAIL AT ALTITUDE TO CAUSE HIM TO LOSE CRUISING ALTITUDE. WE WERE PARTICULARLY CONCERNED AT THAT TIME AS TO WHETHER A HYDRAULIC SYSTEM FAILURE COULD HAVE LOST HIM BOOST PUMP PRESSURE AND CAUSED HIM TO HAVE A FLAMEOUT AND DESCENT TO A VULNERABLE ALTITUDE. RESULTS OF THIS AND OTHER TESTS ARE INCLUDED IN OUR

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REPORT SP-173. WE WERE UNABLE, EVEN WITH THE BOOST PUMP FAILED, TO GET A BLOWOUT IN CRUISING FLIGHT, SUCH AS WOULD HAVE OCCURRED IN THE EARLIER TYPE U-2'S WITH THE J57 ENGINES. WE FOUND NOTHING BASICALLY WRONG IN THE AIRCRAFT OR ITS SYSTEMS WHICH WOULD HAVE BEEN LIKELY TO CAUSE THE 1 MAY INCIDENT. AFTER THESE STUDIES, MY CONCLUSION WAS THAT WE HAD TO ASSUME THAT THE AIRCRAFT HAD BEEN HIT AT HIGH ALTITUDE BY A MISSILE, AS STATED BY THE RUSSIANS AT THE TIME.

WE WERE PROVIDED WITH MANY EXCELLENT PHOTOGRAPHS OF THE WRECKED U-2 ON DISPLAY IN MOSCOW, PARTICULARLY SHOTS MADE BY CARL MYDANS OF LIFE MAGAZINE. THESE PICTURES WERE OF A SUFFICIENT QUALITY THAT WE COULD DETERMINE A NUMBER OF INTERESTING THINGS ABOUT THE WRECKAGE AND COMPARE IT TO OTHER U-2 CRASHES. FOLLOWING ARE THE IMPORTANT CONCLUSIONS FROM THE PHOTOGRAPHIC STUDY:

1. BOTH WINGS FAILED DUE TO DOWN-BENDING AND NOT DUE TO PENETRATION OF CRITICAL STRUCTURE BY SHRAPNEL FROM THE MISSILE.
2. IN NONE OF THE PICTURES WAS THERE EVIDENCE TO SHOW THAT THE HORIZONTAL TAIL WAS RECOVERED. MYDANS PHOTOGRAPH 858-C6-18 SHOWS CLEARLY THAT THE LEFT HORIZONTAL SURFACE BROKE OFF IN UP-BENDING. IT ALSO APPEARS FROM THE POSITION OF THE AFT END OF THE FUSELAGE IN A CORNER THAT THE RIGHT SECTION OF THE STABILIZER IS ALSO MISSING. I HAVE ONE OTHER PHOTOGRAPH WHICH YOU PROVIDED ME WITH -- A PRINT APPROXIMATELY 4 X 5 ENTITLED "THE FIN AND THE RUDDER," IN WHICH IT APPEARS THAT THE RIGHT STABILIZER IS VERY SEVERELY DAMAGED AND CAN BE CONSIDERED ABSOLUTELY INEFFECTIVE.

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3. THE LATTER PHOTOGRAPH ALSO SHOWS THE PARACHUTE CAN WHICH WAS HOUSING THE GRAINGER BOX TO BE DEMOLISHED.

4. WHILE THE DAMAGE TO THE STABILIZER COULD HAVE TAKEN PLACE CONCEIVABLY ON LANDING, IT DOES NOT SEEM VERY LIKELY, BECAUSE OF THE RELATIVELY UNDAMAGED STATUS OF THE VERTICAL TAIL ITSELF.

5 I REPEAT THAT IT IS INTERESTING THAT NOWHERE IN THE EXHIBIT WAS THERE ANY SIGN OF THE HORIZONTAL TAIL. REFER ALSO TO PHOTOGRAPH USSR WAC 157B MOSCOW 55 45 N 37 35 E. THIS PHOTO ALSO CARRIES A NUMBER 435411. THIS PHOTOGRAPH INDICATES THAT THE FUSELAGE PROBABLY HIT ON THE RIGHT LOWER SIDE IN A MANNER THAT WOULD NOT DAMAGE THE LEFTHAND STABILIZER AS BADLY AS THE PICTURE INDICATES.

6. LIFE PHOTOGRAPH 853-CG-12 WAS STUDIED VERY CAREFULLY BY US TO DETERMINE WHETHER OR NOT AN ATTEMPT HAD BEEN MADE TO FIRE THE SEAT. WE CONCLUDED THAT IT HAD NOT BEEN. WE DID NOTE THAT THE RUSSIANS HAD MADE A VERY COMPLETE STUDY OF THE SEAT AND IN THE PROCESS OF DISASSEMBLING IT HAD RECONNECTED THE LAP BELT INITIATOR AND HAD NOT REASSEMBLED IT PROPERLY FOR THE DISPLAY.

7. IN OUR DISCUSSIONS WITH FRANK POWERS ON 14 FEBRUARY, HE DESCRIBED HIS FLIGHT, MAKING THE FOLLOWING POINTS:

A. HE WAS AT A CRUISING ALTITUDE BELOW THE MAXIMUM OBTAINABLE BUT ABOVE 68,000 FEET, AND THE ENGINE WAS THROTTLED BACK AND RUNNING SMOOTHLY. HIS STATEMENTS OF THE COCKPIT INSTRUMENT READINGS IN TERMS OF TAILPIPE TEMPERATURE AND OTHER DETAILS WERE AS THEY SHOULD HAVE BEEN FOR HIS DISTANCE OUT AFTER

TAKEOFF AND THE ALTITUDE HE WAS FLYING.

B. HIS FIRST INDICATION OF TROUBLE RESULTED IN AIRCRAFT GRADUALLY ROLLING TO THE RIGHT, WHICH HE CORRECTED READILY; THEN NOSING DOWN TO AN ATTITUDE THAT BROKE OFF BOTH WINGS.

C. THE AIRCRAFT SPUN WITH GREAT VIOLENCE, SO THAT THE ENGINE BLEW OUT OR WAS THROWN OUT. HIS SUIT THEN INFLATED AND HE ATTEMPTED TO ESCAPE. HE DID NOT FIRE THE SEAT AND IMMEDIATELY PRIOR TO LEAVING THE AIRCRAFT HE WAS SO FAR FORWARD IN HIS HARNESS THAT HE COULD NOT REACH THE DESTRUCTOR SWITCHES.

8. THIS SERIES OF EVENTS WOULD COME ABOUT IN ANYTHING WHICH RESULTED IN LOSS OF HALF OR ALL OF THE HORIZONTAL TAIL. THE U-2 WING IS VERY HIGHLY CAMBERED AND WITHOUT A TAIL SURFACE TO BALANCE THE VERY HIGH PITCHING MOMENT THE AIRCRAFT IMMEDIATELY GOES OVER ON ITS BACK AND, IN SEVERE CASES, HAS BROKEN OFF THE WINGS IN DOWN-BENDING. THIS OCCURRED ONCE IN THE EARLY TESTING DAYS WHEN THE PILOT INADVERTENTLY EXTENDED THE WING FLAPS AT HIGH CRUISING SPEED, WHICH RESULTED IN A HORIZONTAL TAIL FAILURE. IT HAS RESULTED IN TWO OTHER CASES WHERE THE AIRCRAFT EXCEEDED ITS DESIGN SPEED AFTER THE PILOT PASSED OUT DUE TO LACK OF OXYGEN. IN ALL THESE CASES, THE WING FAILURES ARE SIMILAR TO THOSE SHOWN IN THE U-2 PHOTOGRAPHS. THIS TYPE OF FAILURE IS COMMON NOT ONLY TO THE U-2 BUT TO ALL AIRCRAFT WHICH BALANCE OUT THE PITCHING MOMENT BY USE OF THE HORIZONTAL TAIL. THE FAILURE TAKES PLACE IN GENERAL IN A VERY FEW SECONDS CREATING HIGH ACCELERATIONS AND GENERALLY LEAVING THE FUSELAGE SPINNING INVERTED.

9. I WAS ABLE TO CORRELATE ALL OF POWERS' STATEMENTS

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WITH OUR STUDIES OF THE PHOTOGRAPHS, OUR KNOWLEDGE OF THE AERODYNAMIC CHARACTERISTICS OF THE AIRCRAFT, AND EXPERIENCE IN FLIGHT TEST WITH ALL THE MISCELLANEOUS GEAR INVOLVED IN ATTEMPTING AN ESCAPE FROM THE COCKPIT AS HE DESCRIBED.

10. I AM STILL UNABLE TO CONFIRM THAT THE GRAINGER BOX WAS NOT ACTING AS A BEACON FOR A MISSILE GUIDANCE SYSTEM. YOU HAVE MADE STUDIES OF THIS POSSIBILITY AND I KNOW THAT IN THE EARLY DAYS WHEN WE WERE FIRST GIVEN THE DEVICE FOR TEST IT DID EXHIBIT SUCH TENDENCIES. POWERS STATED HE HAD THE BOX TURNED ON, AS HE WAS TOLD TO DO; SO THIS IS ONE QUESTION THAT REMAINS IN MY MIND IS A VERY IMPORTANT ONE TO SETTLE IN CONNECTION WITH THIS ACCIDENT.

11. I WAS SO IMPRESSED BY THE VERY CLEAR DESCRIPTION OF THE INCIDENT BY FRANK, AND HAVING DIRECT KNOWLEDGE OF WHAT HE WAS ORDERED TO DO IN CASE OF CAPTURE, THAT I WILL GLADLY CONTRIBUTE TO A FUND FOR DECORATING THIS OFFICER FOR THE FINE JOB HE DID UNDER THE MOST DIFFICULT CIRCUMSTANCES. HE SATISFIED ME, BY DETAILED QUESTIONS, THAT THE RUSSIANS COULD NOT HAVE BRAIN-WASHED HIM ON DETAIL MATTERS OF HIS ESCAPE FROM THE AIRCRAFT.

END OF MESSAGE

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